

SEQUENCE LISTING

<110> Wyeth Holdings Corporation

<120> METHODS FOR INCREASING NEISSERIA PROTEIN EXPRESSION AND COMPOSITIONS THEREOF

<130> AM100238

<160> 83

<170> PatentIn version 3.2

<210> 1

<211> 1110

<212> DNA

<213> Neisseria meningitidis (group B)

<400> 1

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<213> Neisseria meningitidis (group B)

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Leu Ala Ile Leu Glu Ala Ser Pro Pro Arg Thr Arg Pro Ala Ser Pro
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Pro His Glu Leu Tyr Ser Ala Arg Gly His Ile Ser Ala Ser Pro Ala
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 Ile Leu Glu Gly Leu Tyr Ser Glu Arg Ala Leu Ala Thr His Arg Ser
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 <213> Neisseria meningitidis (group B)

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<213> Neisseria meningitidis (group B)

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Page 6
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115

120

125

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165 170 175

Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu Thr Arg Pro Gly
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Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro Val Ala Leu Ser
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Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly Leu Tyr Gly Leu
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Tyr Ala Leu Ala Thr His Arg Ala Arg Gly Thr Arg Pro Gly Leu Tyr
225 230 235 240

Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro His Glu Val Ala
245 250 255

Leu Gly Leu Tyr Leu Glu Ala Leu Ala Gly Leu Tyr Gly Leu Pro His
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Glu Gly Leu Tyr Thr His Arg Leu Glu Ala Arg Gly Ala Leu Ala Gly
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Leu Tyr Ala Arg Gly Val Ala Leu Ala Leu Ala Ala Ser Asn Gly Leu
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Asn Pro His Glu Ala Ser Pro Ala Ser Pro Ala Leu Ala Ser Glu Arg
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Leu Tyr Ser Ala Leu Ala Ile Leu Glu Ala Ser Pro Pro Arg Thr Arg
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Pro Ala Ser Pro Ser Glu Arg Ala Ser Asn Ala Ser Asn Val Ala Leu
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Val Ala Leu Ala Leu Ala Ser Glu Arg Gly Leu Asn Leu Glu Gly Leu
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Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg Gly His Ile Ser
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Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val Ala Leu Ser Glu
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 Pro Arg Gly Leu Pro His Glu Ser Glu Arg Gly Leu Tyr Pro His Glu
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 His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly Leu Asn Ala Ser Asn
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 Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu Ala Thr Tyr Arg Thr
 465 470 475 480
 His Arg Pro Arg Ala Leu Ala His Ile Ser Pro His Glu Val Ala Leu
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 Arg Gly Leu Asn Pro Arg Thr His Arg Leu Glu Val Ala Leu Pro Arg
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 His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu Ala Leu Tyr Ser His Ile
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 Ser Ala Leu Ala Ala Ser Asn Val Ala Leu Gly Leu Tyr Ala Arg Gly
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Ala Ser Pro Gly Leu Ala Leu Ala Leu Tyr Ser Gly Leu Tyr Thr His
 675 680 685
 Arg Ala Ser Pro Pro Arg Leu Glu Leu Tyr Ser Ala Ser Asn His Ile
 690 695 700
 Ser Gly Leu Asn Val Ala Leu His Ile Ser Ala Arg Gly Leu Glu Thr
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 His Arg Gly Leu Tyr Gly Leu Tyr Thr Tyr Arg Gly Leu Gly Leu Gly
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 Tyr Gly Leu Ala Ser Asn Thr His Arg Ser Glu Arg Thr Tyr Arg Ala
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 Ser Pro Gly Leu Asn Ile Leu Glu Ile Leu Glu Ala Leu Ala Gly Leu
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 Tyr Val Ala Leu Ala Ser Pro Thr Tyr Arg Ala Ser Pro Pro His Glu
 930 935 940

Ser Glu Arg Leu Tyr Ser Ala Arg Gly Thr His Arg Ser Glu Arg Ala
 945 950 955 960

Leu Ala Ile Leu Glu Val Ala Leu Ser Glu Arg Gly Leu Tyr Ala Leu
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Ala Thr Arg Pro Leu Glu Leu Tyr Ser Ala Arg Gly Ala Ser Asn Thr
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His Arg Gly Leu Tyr Ile Leu Glu Gly Leu Tyr Ala Ser Asn Thr Tyr
 995 1000 1005

Arg Thr His Arg Gly Leu Asn Ile Leu Glu Ala Ser Asn Ala Leu
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 <213> Neisseria meningitidis (group B)

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1122

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Arg Thr Lys Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser
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Glu Asp Leu Gly Asp Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp
65 70 75 80

Val Ser Val Ala Gly Gly Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser
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Phe Ile Gly Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val
100 105 110

Ala Asn Gln Phe Asp Asp Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser
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Asn Asn Asp Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp
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Met Pro Val Ser Val Arg Tyr Asp Ser Pro Glu Phe Ser Gly Phe Ser
145 150 155 160

Gly Ser Val Gln Phe Val Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr
165 170 175

Pro Ala Tyr Tyr Thr Lys Asp Thr Asn Asn Asn Leu Thr Leu Val Pro
180 185 190

Ala Val Val Gly Lys Pro Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn
195 200 205

Tyr Lys Asn Gly Gly Phe Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Arg
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His Ala Asn Val Gly Arg Asn Ala Phe Glu Leu Phe Leu Ile Gly Ser
225 230 235 240

Gly Ser Asp Gln Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val
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 Ala Ala Gln Leu Asp Leu Ser Glu Asn Gly Asp Lys Thr Lys Asn Ser
 275 280 285
 Thr Thr Glu Ile Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val
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 Pro Arg Ile Ser Tyr Ala His Gly Phe Asp Phe Ile Glu Arg Gly Lys
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 Lys Gly Glu Asn Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr
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 Asp Phe Ser Lys Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys
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Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn Gln
 100 105 110

Phe Asp Asp Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser Asn Asn Asp
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Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro Val
 130 135 140

Ser Val Arg Tyr Asp Ser Pro Asp Phe Ser Gly Phe Ser Gly Ser Val
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Gln Phe Val Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr Pro Ala His
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Val Val Val Asn Asn Lys Val Ala Thr His Val Pro Ala Val Val Gly
 180 185 190

Lys Pro Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn Gly
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 Gly Phe Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Arg His Ala Asn Val
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 225 230 235 240
 Gln Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu
 245 250 255
 Thr Gly Gly Tyr Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln
 260 265 270
 Leu Asp Leu Ser Glu Asn Ala Asp Lys Thr Lys Asn Ser Thr Thr Glu
 275 280 285
 Ile Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile
 290 295 300
 Ser Tyr Ala His Gly Phe Asp Leu Ile Glu Arg Gly Lys Lys Gly Glu
 305 310 315 320
 Asn Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser
 325 330 335
 Lys Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr
 340 345 350
 Gly Ile Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg
 355 360 365
 His Lys Phe
 370

<210> 9
 <211> 1107
 <212> DNA
 <213> *Neisseria meningitidis* (group B)

<400> 9
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 cagttgaccg aaccgccctc aaagagtcaa cctcaggtaa aagttactaa ggccaaaagc 120
 cgcattcagga cgaaaatcag tgatttcggc tcgtttatcg gctttaaggg gagtgaggat 180
 ttgggcgaag ggctgaaggc tgtttggcag cttgagcaag acgtatccgt tgccggcggc 240
 ggcgcgaccc agtggggcaa caggaatcc tttgtcggct tggcaggcga attcggtacg 300
 ctgcgcgccg gtcgcgttgc gaatcagttt gacgatgcca gccaagccat tgatccttgg 360
 gacagcaaca atgatgtggc ttcgcaattg ggtattttca aacgccacga cgatatgccg 420
 gtttccgtac gctacgactc tccggacttt tccggtttca gcggcagcgt ccaattcgtt 480
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ccgatccaaa acagcaagtc cgcctatacg ccgggtcatt atactaggca gaacaatgct 540
 gatgttttcg ttccggctgt tgtcggcaag cccggatcgg atgtgtatta tgccggtctg 600
 aattacaaaa atggcgggtt tgccgggagc tatgccttta aatatgagc acacgccaat 660
 gtcggacgtg atgcttttga gttgttcttg ctcggcagca cgagtgatga agccaaaggt 720
 accgatccct tgaaaaacca tcaggtacac cgcctgacgg gcggctatga ggaaggcggc 780
 ttgaatctcg ccttgggcggc tcagttggat ttgtctgaaa atggcgacaa agccaaaacc 840
 aaaaacagta cgaccgaaat tgccgccact gcttcctacc gcttcggtaa tgcagttccg 900
 cgcacagct atgcccattg tttcgaattg atcgaacgcg gtaaaaaagg cgaaaatacc 960
 agctacgata aaatcatcgc cggcggtgat tatgattttt ccaaaccgcac ttccgccatc 1020
 gtgtctggcg cttggctgaa acgcaatacc ggcacggcga actacactca aattaatgcc 1080
 gcctccgtcg gtttgcgcca caaatc 1107

<210> 10
 <211> 369
 <212> PRT
 <213> Neisseria meningitidis (group B)

<400> 10

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
 1 5 10 15

Asn Phe Gln Leu Gln Leu Thr Glu Pro Pro Ser Lys Ser Gln Pro Gln
 20 25 30

Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr Lys Ile Ser Asp
 35 40 45

Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp Leu Gly Glu Gly
 50 55 60

Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser Val Ala Gly Gly
 65 70 75 80

Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser Phe Val Gly Leu Ala Gly
 85 90 95

Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn Gln Phe Asp Asp
 100 105 110

Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser Asn Asn Asp Val Ala Ser
 115 120 125

Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro Val Ser Val Arg
 130 135 140

Tyr Asp Ser Pro Asp Phe Ser Gly Phe Ser Gly Ser Val Gln Phe Val
 145 150 155 160

Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr Pro Ala His Tyr Thr Arg
165 170 175

Gln Asn Asn Ala Asp Val Phe Val Pro Ala Val Val Gly Lys Pro Gly
180 185 190

Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn Gly Gly Phe Ala
195 200 205

Gly Ser Tyr Ala Phe Lys Tyr Ala Arg His Ala Asn Val Gly Arg Asp
210 215 220

Ala Phe Glu Leu Phe Leu Leu Gly Ser Thr Ser Asp Glu Ala Lys Gly
225 230 235 240

Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu Thr Gly Gly Tyr
245 250 255

Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln Leu Asp Leu Ser
260 265 270

Glu Asn Gly Asp Lys Ala Lys Thr Lys Asn Ser Thr Thr Glu Ile Ala
275 280 285

Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile Ser Tyr
290 295 300

Ala His Gly Phe Asp Leu Ile Glu Arg Gly Lys Lys Gly Glu Asn Thr
305 310 315 320

Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser Lys Arg
325 330 335

Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr Gly Ile
340 345 350

Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg His Lys
355 360 365

Phe

<210> 11
<211> 1110
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 11
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caattgactg aacaaccctc aagaactcaa ggtcaaacga gcaatcaggt aaaagttact 120
aaggccaaaa gccgcatcag gacgaaaatc agtgatttcg gctcgtttat cggctttaag 180
Page 16

gggagcgaagg atttgggcga aggtctgaag gctgtttggc agcttgagca agacgtatcc 240
 gttgccggcg gcggcgcgac ccgttggggc aacaggggaat cctttgtcgg cttggcaggc 300
 gaattcggca cgctgcgcgc cggccgcgtt gcgaatcagt ttgacgatgc cagcaaagcc 360
 attgatcctt gggacagcaa taatgttgtg gcttcgcaat tgggtatttt caaacgccac 420
 gacgatatgc cggtttccgt acgctacgac tctccggact tttccggttt cagcggcagc 480
 gtccaattcg ttccggctca aaacagcaag tccgcctata agccggctta tgtggatgag 540
 aagaaaatgg ttcattgcggc tgttgtcggc aagcccggat cggatgtgta ttatgccggt 600
 ctgaattaca aaaatggcgg ttttgccggg aactatgcct ttaaatatgc gaaacacgcc 660
 aatgtggggc gtgatgcttt taatttgttc ttgcttgggc gcatcggcga tgatgatgaa 720
 gccaaaggta ccgatccctt gaaaaacat caggtacacc gcctgacggg cggctatgag 780
 gaaggcggct tgaatctcgc cttggcggct cagttggatt tgtctgaaaa tggcgacaaa 840
 accaaaaaca gtacgaccga aattgccgcc actgcttcct accgcttcgg gaatgcagtt 900
 ccacgcatca gctatgccca tggtttcgac tttatcgaac gcggtaaaaa aggcgaacat 960
 accagctacg atcaaatacat cgccggcggt gattatgatt tttccaaacg cacttccgcc 1020
 atcgtgtctg gtgcttggct gaaacgcaat accggcatcg gcaactacac tcaaattaat 1080
 gccgcctccg tcggtttgcg ccacaaattc 1110

<210> 12
 <211> 370
 <212> PRT
 <213> *Neisseria meningitidis* (group B)

<400> 12

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
 1 5 10 15

Asn Tyr Gln Leu Gln Leu Thr Glu Gln Pro Ser Arg Thr Gln Gly Gln
 20 25 30

Thr Ser Asn Gln Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr
 35 40 45

Lys Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp
 50 55 60

Leu Gly Glu Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser
 65 70 75 80

Val Ala Gly Gly Gly Ala Thr Arg Trp Gly Asn Arg Glu Ser Phe Val
 85 90 95

Gly Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn
 100 105 110

Gln Phe Asp Asp Ala Ser Lys Ala Ile Asp Pro Trp Asp Ser Asn Asn
 115 120 125
 Val Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro
 130 135 140
 Val Ser Val Arg Tyr Asp Ser Pro Asp Phe Ser Gly Phe Ser Gly Ser
 145 150 155 160
 Val Gln Phe Val Pro Ala Gln Asn Ser Lys Ser Ala Tyr Lys Pro Ala
 165 170 175
 Tyr Val Asp Glu Lys Lys Met Val His Ala Ala Val Val Gly Lys Pro
 180 185 190
 Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn Gly Gly Phe
 195 200 205
 Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Lys His Ala Asn Val Gly Arg
 210 215 220
 Asp Ala Phe Asn Leu Phe Leu Leu Gly Arg Ile Gly Asp Asp Asp Glu
 225 230 235 240
 Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu Thr
 245 250 255
 Gly Gly Tyr Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln Leu
 260 265 270
 Asp Leu Ser Glu Asn Gly Asp Lys Thr Lys Asn Ser Thr Thr Glu Ile
 275 280 285
 Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile Ser
 290 295 300
 Tyr Ala His Gly Phe Asp Phe Ile Glu Arg Gly Lys Lys Gly Glu His
 305 310 315 320
 Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser Lys
 325 330 335
 Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr Gly
 340 345 350
 Ile Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg His
 355 360 365
 Lys Phe
 370

<211> 1104
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 13
 atggatgtca gcctgtacgg cgaaatcaaa gccggcgtgg aaggcaggaa catccagctg 60
 caattgaccg agcagccctc aaaggctcaa ggtcaaacga acaatcaggt aaaagttact 120
 aaggcaaaaa gccgcatcag gacgaaaatc agcgatttcg gctcgtttat cggctttaag 180
 gggagcaggg atttgggcga agggctgaag gctgtttggc agcttgagca agacgtatcc 240
 gttgccggcg gcggcgcgac ccagtggggc aacagggaaat cctttgtcgg cttggcaggc 300
 gaattcggta cgctgcgcgc cggtcgcggt gcaaatacagt ttgacgatgc cagccaagcc 360
 attgatcctt gggacagcaa caatgatgtg gcttcgcaat tgggtatttt caaacgccac 420
 gacgatatgc cggtttccgt acgctacgac tctccggact tttccggttt cagcggcagc 480
 gtccaattcg ttccggctca aaacagcaag tccgcctata cgccggctta tgtggatgag 540
 cagagtaagt atcatgcggc tggtgtcggc aagcccggat cggatgtgta ttatgccggt 600
 ctgaattata agaatggcgg ttttgccggg aactatgcct ttaaataatgc gaaacacgcc 660
 aatgtcggac gtgatgcttt tgagttgttc ttgctcggca gcgggagtg tcaagccaaa 720
 ggtaccgatc ccttgaaaaa ccatcaggta caccgcctga cgggcggcta tgaggaaggc 780
 ggcttgaatc tcgccttggc ggctcagttg gatttgtctg aaaatgccga caaaacaaa 840
 aacagtacga ccgaaattgc cgccactgct tcctaccgct tcggtaatgc agttccacgc 900
 atcagctatg cccatggttt cgacttgatc gaacgcggta aaaaaggcga aaataccagc 960
 tacgatcaaa tcatcgccgg cgttgattat gatttttcca aacgcacttc cgccatcgtg 1020
 tctggcgctt ggctgaaacg caataccggc atcggcaact acactcaaat taatgccgcc 1080
 tccgtcgggt tgcgccacaa attc 1104

<210> 14
 <211> 1056
 <212> PRT
 <213> Neisseria meningitidis (group B)

<400> 14
 Met Glu Thr Ala Ser Pro Val Ala Leu Ser Glu Arg Leu Glu Thr Tyr
 1 5 10 15
 Arg Gly Leu Tyr Gly Leu Ile Leu Glu Leu Tyr Ser Ala Leu Ala Gly
 20 25 30
 Leu Tyr Val Ala Leu Gly Leu Gly Leu Tyr Ala Arg Gly Ala Ser Asn
 35 40 45
 Ile Leu Glu Gly Leu Asn Leu Glu Gly Leu Asn Leu Glu Thr His Arg
 50 55 60
 Gly Leu Gly Leu Asn Pro Arg Ser Glu Arg Leu Tyr Ser Ala Leu Ala
 65 70 75 80

Gly Leu Asn Gly Leu Tyr Gly Leu Asn Thr His Arg Ala Ser Asn Ala
 85 90 95
 Ser Asn Gly Leu Asn Val Ala Leu Leu Tyr Ser Val Ala Leu Thr His
 100 105 110
 Arg Leu Tyr Ser Ala Leu Ala Leu Tyr Ser Ser Glu Arg Ala Arg Gly
 115 120 125
 Ile Leu Glu Ala Arg Gly Thr His Arg Leu Tyr Ser Ile Leu Glu Ser
 130 135 140
 Glu Arg Ala Ser Pro Pro His Glu Gly Leu Tyr Ser Glu Arg Pro His
 145 150 155 160
 Glu Ile Leu Glu Gly Leu Tyr Pro His Glu Leu Tyr Ser Gly Leu Tyr
 165 170 175
 Ser Glu Arg Gly Leu Ala Ser Pro Leu Glu Gly Leu Tyr Gly Leu Gly
 180 185 190
 Leu Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu Thr Arg Pro
 195 200 205
 Gly Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro Val Ala Leu
 210 215 220
 Ser Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly Leu Tyr Gly
 225 230 235 240
 Leu Tyr Ala Leu Ala Thr His Arg Gly Leu Asn Thr Arg Pro Gly Leu
 245 250 255
 Tyr Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro His Glu Val
 260 265 270
 Ala Leu Gly Leu Tyr Leu Glu Ala Leu Ala Gly Leu Tyr Gly Leu Pro
 275 280 285
 His Glu Gly Leu Tyr Thr His Arg Leu Glu Ala Arg Gly Ala Leu Ala
 290 295 300
 Gly Leu Tyr Ala Arg Gly Val Ala Leu Ala Leu Ala Ala Ser Asn Gly
 305 310 315 320
 Leu Asn Pro His Glu Ala Ser Pro Ala Ser Pro Ala Leu Ala Ser Glu
 325 330 335
 Arg Gly Leu Asn Ala Leu Ala Ile Leu Glu Ala Ser Pro Pro Arg Thr
 340 345 350

Arg Pro Ala Ser Pro Ser Glu Arg Ala Ser Asn Ala Ser Asn Ala Ser
 355 360 365

Pro Val Ala Leu Ala Leu Ala Ser Glu Arg Gly Leu Asn Leu Glu Gly
 370 375 380

Leu Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg Gly His Ile
 385 390 395 400

Ser Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val Ala Leu Ser
 405 410 415

Glu Arg Val Ala Leu Ala Arg Gly Thr Tyr Arg Ala Ser Pro Ser Glu
 420 425 430

Arg Pro Arg Ala Ser Pro Pro His Glu Ser Glu Arg Gly Leu Tyr Pro
 435 440 445

His Glu Ser Glu Arg Gly Leu Tyr Ser Glu Arg Val Ala Leu Gly Leu
 450 455 460

Asn Pro His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly Leu Asn Ala
 465 470 475 480

Ser Asn Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu Ala Thr Tyr
 485 490 495

Arg Thr His Arg Pro Arg Ala Leu Ala Thr Tyr Arg Val Ala Leu Ala
 500 505 510

Ser Pro Gly Leu Gly Leu Asn Ser Glu Arg Leu Tyr Ser Thr Tyr Arg
 515 520 525

His Ile Ser Ala Leu Ala Ala Leu Ala Val Ala Leu Val Ala Leu Gly
 530 535 540

Leu Tyr Leu Tyr Ser Pro Arg Gly Leu Tyr Ser Glu Arg Ala Ser Pro
 545 550 555 560

Val Ala Leu Thr Tyr Arg Thr Tyr Arg Ala Leu Ala Gly Leu Tyr Leu
 565 570 575

Glu Ala Ser Asn Thr Tyr Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr
 580 585 590

Gly Leu Tyr Pro His Glu Ala Leu Ala Gly Leu Tyr Ala Ser Asn Thr
 595 600 605

Tyr Arg Ala Leu Ala Pro His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu
 610 615 620

Ala Leu Tyr Ser His Ile Ser Ala Leu Ala Ala Ser Asn Val Ala Leu
625 630 635 640

Gly Leu Tyr Ala Arg Gly Ala Ser Pro Ala Leu Ala Pro His Glu Gly
645 650 655

Leu Leu Glu Pro His Glu Leu Glu Leu Glu Gly Leu Tyr Ser Glu Arg
660 665 670

Gly Leu Tyr Ser Glu Arg Ala Ser Pro Gly Leu Asn Ala Leu Ala Leu
675 680 685

Tyr Ser Gly Leu Tyr Thr His Arg Ala Ser Pro Pro Arg Leu Glu Leu
690 695 700

Tyr Ser Ala Ser Asn His Ile Ser Gly Leu Asn Val Ala Leu His Ile
705 710 715 720

Ser Ala Arg Gly Leu Glu Thr His Arg Gly Leu Tyr Gly Leu Tyr Thr
725 730 735

Tyr Arg Gly Leu Gly Leu Gly Leu Tyr Gly Leu Tyr Leu Glu Ala Ser
740 745 750

Asn Leu Glu Ala Leu Ala Leu Glu Ala Leu Ala Ala Leu Ala Gly Leu
755 760 765

Asn Leu Glu Ala Ser Pro Leu Glu Ser Glu Arg Gly Leu Ala Ser Asn
770 775 780

Ala Leu Ala Ala Ser Pro Leu Tyr Ser Thr His Arg Leu Tyr Ser Ala
785 790 795 800

Ser Asn Ser Glu Arg Thr His Arg Thr His Arg Gly Leu Ile Leu Glu
805 810 815

Ala Leu Ala Ala Leu Ala Thr His Arg Ala Leu Ala Ser Glu Arg Thr
820 825 830

Tyr Arg Ala Arg Gly Pro His Glu Gly Leu Tyr Ala Ser Asn Ala Leu
835 840 845

Ala Val Ala Leu Pro Arg Ala Arg Gly Ile Leu Glu Ser Glu Arg Thr
850 855 860

Tyr Arg Ala Leu Ala His Ile Ser Gly Leu Tyr Pro His Glu Ala Ser
865 870 875 880

Pro Leu Glu Ile Leu Glu Gly Leu Ala Arg Gly Gly Leu Tyr Leu Tyr
885 890 895

Ser Leu Tyr Ser Gly Leu Tyr Gly Leu Ala Ser Asn Thr His Arg Ser
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900 905 910
 Glu Arg Thr Tyr Arg Ala Ser Pro Gly Leu Asn Ile Leu Glu Ile Leu
 915 920 925
 Glu Ala Leu Ala Gly Leu Tyr Val Ala Leu Ala Ser Pro Thr Tyr Arg
 930 935 940
 Ala Ser Pro Pro His Glu Ser Glu Arg Leu Tyr Ser Ala Arg Gly Thr
 945 950 955 960
 His Arg Ser Glu Arg Ala Leu Ala Ile Leu Glu Val Ala Leu Ser Glu
 965 970 975
 Arg Gly Leu Tyr Ala Leu Ala Thr Arg Pro Leu Glu Leu Tyr Ser Ala
 980 985 990
 Arg Gly Ala Ser Asn Thr His Arg Gly Leu Tyr Ile Leu Glu Gly Leu
 995 1000 1005
 Tyr Ala Ser Asn Thr Tyr Arg Thr His Arg Gly Leu Asn Ile Leu
 1010 1015 1020
 Glu Ala Ser Asn Ala Leu Ala Ala Leu Ala Ser Glu Arg Val Ala
 1025 1030 1035
 Leu Gly Leu Tyr Leu Glu Ala Arg Gly His Ile Ser Leu Tyr Ser
 1040 1045 1050
 Pro His Glu
 1055

<210> 15
 <211> 1119
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 15
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 caattgaccg agcagcccca agtaactaac ggtgtgcaag gcaatcaggt aaaagttact 120
 aaggccaaaa gccgcatcag gacgaaaatc agcgatttcg gctcgtttat cggctttaag 180
 gggagcgagg atttgggcga agggctgaag gctgtttggc agcttgagca agacgtatcc 240
 gttgccggcg gcggcgcgtc ccagtggggc aacagggaat cttttatcgg cttggcaggc 300
 gaattcggtg cgctgcgcgc cggtcgcgtt gcaaatacgt ttgacgatgc cagccaagcc 360
 attaatacctt gggacagcaa taatgatgtg gcttcgcaat tgggtatttt caaacgccac 420
 gacgatatgc cggtttccgt acgctacgat tctccggaat tttccggttt cagcggcagc 480
 gtccaattcg ttccgggtca aaacagcaag tccgcctata agccggctta ttataactaag 540
 gatacaaaaca ataatacttac tctcgttccg gctgttgctg gcaagcccgg atcggatgtg 600

tattatgccg gtctgaatta caaaaatggc ggttttgccg ggaactatgc ctttaaatat	660
gcgagacacg ccaatgtcgg acgtaatgct tttgagttgt tcttgatcgg cagcgcgacg	720
agtgatgaag ccaaagggtac cgatcccttg aaaaaccatc aggtacaccg cctgacgggc	780
ggctatgagg aaggcgggctt gaatctcgcc ttggcggctc agttggattt gtctgaaaat	840
gccgacaaaa ccaaaaacag tacgaccgaa attgccgcca ctgcttccta ccgcttcggt	900
aatgcagttc cgcgcatcag ctatgcccac ggtttcgact ttatcgaacg cggtaaaaaa	960
ggcgaaaata ccagctacga tcaaatcatc gccggcggtg attatgattt ttccaaacgc	1020
acttccgcca tcgtgtctgg cgcttggtg aaacgcaata ccggcatcgg caactacact	1080
caaattaatg ccgcctccgt cggtttgcgc cacaaattc	1119

<210> 16
 <211> 1070
 <212> PRT
 <213> Neisseria meningitidis (group B)

<400> 16

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Arg	Gly	Leu	Tyr	Gly	Leu	Ile	Leu	Glu	Leu	Tyr	Ser	Ala	Leu	Ala	Gly	20	25	30	
Leu	Tyr	Val	Ala	Leu	Gly	Leu	Gly	Leu	Tyr	Ala	Arg	Gly	Ala	Ser	Asn	35	40	45	
Ile	Leu	Glu	Gly	Leu	Asn	Ala	Leu	Ala	Gly	Leu	Asn	Leu	Glu	Thr	His	50	55	60	
Arg	Gly	Leu	Gly	Leu	Asn	Pro	Arg	Gly	Leu	Asn	Val	Ala	Leu	Thr	His	65	70	75	80
Arg	Ala	Ser	Asn	Gly	Leu	Tyr	Val	Ala	Leu	Gly	Leu	Asn	Gly	Leu	Tyr	85	90	95	
Ala	Ser	Asn	Gly	Leu	Asn	Val	Ala	Leu	Leu	Tyr	Ser	Val	Ala	Leu	Thr	100	105	110	
His	Arg	Leu	Tyr	Ser	Ala	Leu	Ala	Leu	Tyr	Ser	Ser	Glu	Arg	Ala	Arg	115	120	125	
Gly	Ile	Leu	Glu	Ala	Arg	Gly	Thr	His	Arg	Leu	Tyr	Ser	Ile	Leu	Glu	130	135	140	
Ser	Glu	Arg	Ala	Ser	Pro	Pro	His	Glu	Gly	Leu	Tyr	Ser	Glu	Arg	Pro	145	150	155	160
His	Glu	Ile	Leu	Glu	Gly	Leu	Tyr	Pro	His	Glu	Leu	Tyr	Ser	Gly	Leu	165	170	175	

Tyr Ser Glu Arg Gly Leu Ala Ser Pro Leu Glu Gly Leu Tyr Gly Leu
 180 185 190
 Gly Leu Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu Thr Arg
 195 200 205
 Pro Gly Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro Val Ala
 210 215 220
 Leu Ser Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly Leu Tyr
 225 230 235 240
 Gly Leu Tyr Ala Leu Ala Ser Glu Arg Gly Leu Asn Thr Arg Pro Gly
 245 250 255
 Leu Tyr Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro His Glu
 260 265 270
 Ile Leu Glu Gly Leu Tyr Leu Glu Ala Leu Ala Gly Leu Tyr Gly Leu
 275 280 285
 Pro His Glu Gly Leu Tyr Thr His Arg Leu Glu Ala Arg Gly Ala Leu
 290 295 300
 Ala Gly Leu Tyr Ala Arg Gly Val Ala Leu Ala Leu Ala Ala Ser Asn
 305 310 315 320
 Gly Leu Asn Pro His Glu Ala Ser Pro Ala Ser Pro Ala Leu Ala Ser
 325 330 335
 Glu Arg Gly Leu Asn Ala Leu Ala Ile Leu Glu Ala Ser Asn Pro Arg
 340 345 350
 Thr Arg Pro Ala Ser Pro Ser Glu Arg Ala Ser Asn Ala Ser Asn Ala
 355 360 365
 Ser Pro Val Ala Leu Ala Leu Ala Ser Glu Arg Gly Leu Asn Leu Glu
 370 375 380
 Gly Leu Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg Gly His
 385 390 395 400
 Ile Ser Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val Ala Leu
 405 410 415
 Ser Glu Arg Val Ala Leu Ala Arg Gly Thr Tyr Arg Ala Ser Pro Ser
 420 425 430
 Glu Arg Pro Arg Gly Leu Pro His Glu Ser Glu Arg Gly Leu Tyr Pro
 435 440 445

His Glu Ser Glu Arg Gly Leu Tyr Ser Glu Arg Val Ala Leu Gly Leu
450 455 460

Asn Pro His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly Leu Asn Ala
465 470 475 480

Ser Asn Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu Ala Thr Tyr
485 490 495

Arg Leu Tyr Ser Pro Arg Ala Leu Ala Thr Tyr Arg Thr Tyr Arg Thr
500 505 510

His Arg Leu Tyr Ser Ala Ser Pro Thr His Arg Ala Ser Asn Ala Ser
515 520 525

Asn Ala Ser Asn Leu Glu Thr His Arg Leu Glu Val Ala Leu Pro Arg
530 535 540

Ala Leu Ala Val Ala Leu Val Ala Leu Gly Leu Tyr Leu Tyr Ser Pro
545 550 555 560

Arg Gly Leu Tyr Ser Glu Arg Ala Ser Pro Val Ala Leu Thr Tyr Arg
565 570 575

Thr Tyr Arg Ala Leu Ala Gly Leu Tyr Leu Glu Ala Ser Asn Thr Tyr
580 585 590

Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr Gly Leu Tyr Pro His Glu
595 600 605

Ala Leu Ala Gly Leu Tyr Ala Ser Asn Thr Tyr Arg Ala Leu Ala Pro
610 615 620

His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu Ala Ala Arg Gly His Ile
625 630 635 640

Ser Ala Leu Ala Ala Ser Asn Val Ala Leu Gly Leu Tyr Ala Arg Gly
645 650 655

Ala Ser Asn Ala Leu Ala Pro His Glu Gly Leu Leu Glu Pro His Glu
660 665 670

Leu Glu Ile Leu Glu Gly Leu Tyr Ser Glu Arg Ala Leu Ala Thr His
675 680 685

Arg Ser Glu Arg Ala Ser Pro Gly Leu Ala Leu Ala Leu Tyr Ser Gly
690 695 700

Leu Tyr Thr His Arg Ala Ser Pro Pro Arg Leu Glu Leu Tyr Ser Ala
705 710 715 720

Ser Asn His Ile Ser Gly Leu Asn Val Ala Leu His Ile Ser Ala Arg
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725

730

735

Gly Leu Glu Thr His Arg Gly Leu Tyr Gly Leu Tyr Thr Tyr Arg Gly
740 745 750

Leu Gly Leu Gly Leu Tyr Gly Leu Tyr Leu Glu Ala Ser Asn Leu Glu
755 760 765

Ala Leu Ala Leu Glu Ala Leu Ala Ala Leu Ala Gly Leu Asn Leu Glu
770 775 780

Ala Ser Pro Leu Glu Ser Glu Arg Gly Leu Ala Ser Asn Ala Leu Ala
785 790 795 800

Ala Ser Pro Leu Tyr Ser Thr His Arg Leu Tyr Ser Ala Ser Asn Ser
805 810 815

Glu Arg Thr His Arg Thr His Arg Gly Leu Ile Leu Glu Ala Leu Ala
820 825 830

Ala Leu Ala Thr His Arg Ala Leu Ala Ser Glu Arg Thr Tyr Arg Ala
835 840 845

Arg Gly Pro His Glu Gly Leu Tyr Ala Ser Asn Ala Leu Ala Val Ala
850 855 860

Leu Pro Arg Ala Arg Gly Ile Leu Glu Ser Glu Arg Thr Tyr Arg Ala
865 870 875 880

Leu Ala His Ile Ser Gly Leu Tyr Pro His Glu Ala Ser Pro Pro His
885 890 895

Glu Ile Leu Glu Gly Leu Ala Arg Gly Gly Leu Tyr Leu Tyr Ser Leu
900 905 910

Tyr Ser Gly Leu Tyr Gly Leu Ala Ser Asn Thr His Arg Ser Glu Arg
915 920 925

Thr Tyr Arg Ala Ser Pro Gly Leu Asn Ile Leu Glu Ile Leu Glu Ala
930 935 940

Leu Ala Gly Leu Tyr Val Ala Leu Ala Ser Pro Thr Tyr Arg Ala Ser
945 950 955 960

Pro Pro His Glu Ser Glu Arg Leu Tyr Ser Ala Arg Gly Thr His Arg
965 970 975

Ser Glu Arg Ala Leu Ala Ile Leu Glu Val Ala Leu Ser Glu Arg Gly
980 985 990

Leu Tyr Ala Leu Ala Thr Arg Pro Leu Glu Leu Tyr Ser Ala Arg Gly
995 1000 1005

Ala Ser Asn Thr His Arg Gly Leu Tyr Ile Leu Glu Gly Leu Tyr
 1010 1015 1020

Ala Ser Asn Thr Tyr Arg Thr His Arg Gly Leu Asn Ile Leu Glu
 1025 1030 1035

Ala Ser Asn Ala Leu Ala Ala Leu Ala Ser Glu Arg Val Ala Leu
 1040 1045 1050

Gly Leu Tyr Leu Glu Ala Arg Gly His Ile Ser Leu Tyr Ser Pro
 1055 1060 1065

His Glu
 1070

<210> 17
 <211> 1113
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 17
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 gccaaaagcc gcatcaggac gaaaatcagt gatttcggct cgtttatcgg ctttaagggg 180
 agtgaggatt tgggcgacgg gctgaaggct gtttggcagc ttgagcaaga cgtatccgtt 240
 gccggcggcg gcgcgaccca gtggggcaac agggaatcct ttatcggctt ggcaggcgaa 300
 ttcggtacgc tgcgcgccgg tcgcgttgcg aatcagtttg acgatgccag ccaagccatt 360
 gatccttggg acagcaataa tgatgtggct tcgcaattgg gtattttcaa acgccacgac 420
 gacatgccgg tttccgtacg ctacgattcc cccgaatttt ccggtttcag cggcagcgtt 480
 caattcggtc cgatccaaaa cagcaagtcc gcctatacgc cggcttatta tactaaggat 540
 acaaacaata atcttactct cgttccggct gttgtcggca agcccggatc ggatgtgtat 600
 tatgccggtc tgaattacaa aaatggcggg tttgccggga actatgcctt taaatatgcg 660
 agacacgcca atgtcggacg taatgctttt gagttgttct tgatcggcag cgggagtgat 720
 caagccaaag gtaccgatcc cttgaaaaac catcaggtag accgtctgac gggcggctat 780
 gaggaaggcg gcttgaatct cgccttggcg gctcagttgg atttgtctga aaatggcgac 840
 aaaacaaaa acagtacgac cgaaattgcc gccactgctt cctaccgctt cggtaatgca 900
 gttccacgca tcagctatgc ccatggtttc gactttatcg aacgcggtaa aaaaggcgaa 960
 aataccagct acgatcaa atcatcgccggc gttgattatg atttttccaa acgcacttcc 1020
 gccatcgtgt ctggcgcttg gctgaagcgc aataccggca tcggcaacta cactcaaatt 1080
 aatgccgcct ccgtcggttt gcgccacaaa ttc 1113

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 <211> 371

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 18

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
1 5 10 15

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20 25 30

Ser Gly Gln Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr Lys
35 40 45

Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp Leu
50 55 60

Gly Asp Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser Val
65 70 75 80

Ala Gly Gly Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser Phe Ile Gly
85 90 95

Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn Gln
100 105 110

Phe Asp Asp Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser Asn Asn Asp
115 120 125

Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro Val
130 135 140

Ser Val Arg Tyr Asp Ser Pro Glu Phe Ser Gly Phe Ser Gly Ser Val
145 150 155 160

Gln Phe Val Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr Pro Ala Tyr
165 170 175

Tyr Thr Lys Asp Thr Asn Asn Asn Leu Thr Leu Val Pro Ala Val Val
180 185 190

Gly Lys Pro Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn
195 200 205

Gly Gly Phe Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Arg His Ala Asn
210 215 220

Val Gly Arg Asn Ala Phe Glu Leu Phe Leu Ile Gly Ser Gly Ser Asp
225 230 235 240

Gln Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu
245 250 255

Thr Gly Gly Tyr Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln
 260 265 270

Leu Asp Leu Ser Glu Asn Gly Asp Lys Thr Lys Asn Ser Thr Thr Glu
 275 280 285

Ile Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile
 290 295 300

Ser Tyr Ala His Gly Phe Asp Phe Ile Glu Arg Gly Lys Lys Gly Glu
 305 310 315 320

Asn Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser
 325 330 335

Lys Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr
 340 345 350

Gly Ile Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg
 355 360 365

His Lys Phe
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<210> 19
 <211> 1110
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 19
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 cgcacatcagga cgaaaatcaa cgatttcggc tcgtttatcg gctttaaggg gagcgaggat 180
 ttggggaag ggctgaaggc tgtttggcag cttgagcaag acgtatccgt tgccggcggc 240
 ggcgcgaccc agtggggcaa cagggaatcc tttatcggct tggcaggcga attcggcacg 300
 ctgcgcgccg gtcgcgttgc aaatcagttt gacgatgccg gccaagccat tgatccttgg 360
 gacagcaaca atgatgtggc ttcgcaattg ggtattttca aacgccacga cgatatgccg 420
 gtttctgtac gctacgactc tccggacttt tccggtttca gcggcagcgt ccaattcggt 480
 ccggcccaaa acagcaaata cgccatacag ccggctactt atactgtgga tagtagtggt 540
 gttgttactc ccgttcctgc tgttgtcggc aagcccggat cggatgtgta ttatgccggt 600
 ctgaattaca aaaatggcgg ttttgccggg aactatgcct ttaaatacgc gaaacacgcc 660
 aatgtgggccc gtgatgcttt taatttggtc ttgcttgggc gcatcggcga ggatgatgaa 720
 gccaaaggta ccgatccctt gaaaaacat caggtaacac gcctgacggg cggctatgag 780
 gaaggcggct tgaatctcgc cttggcggct cagttggatt tgtctgaaaa tggcgacaaa 840
 accaaaaaca gtacgaccga aattgccgcc actgcttcct accgcttcgg gaatgcagtt 900
 ccacgcacatca gctatgccca tggtttcgac tttatcgaac gcggtaaaaa aggcgaacat 960

accagctacg atcaaatcat cgccggcggtt gattatgatt tttccaaacg cacttccgcc 1020
atcgtgtctg gtgcttggct gaaacgcaat accggcatcg gcaactacac tcaaattaat 1080
gccgcctccg tcggtttgcg ccacaaattc 1110

<210> 20
<211> 1060
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 20

Met Glu Thr Ala Ser Pro Val Ala Leu Ser Glu Arg Leu Glu Thr Tyr
1 5 10 15

Arg Gly Leu Tyr Gly Leu Ile Leu Glu Leu Tyr Ser Ala Leu Ala Gly
20 25 30

Leu Tyr Val Ala Leu Gly Leu Gly Leu Tyr Ala Ser Asn Ala Ser Asn
35 40 45

Ile Leu Glu Gly Leu Asn Leu Glu Gly Leu Asn Leu Glu Thr His Arg
50 55 60

Gly Leu Pro Arg Pro Arg Ser Glu Arg Leu Tyr Ser Gly Leu Tyr Gly
65 70 75 80

Leu Asn Thr His Arg Gly Leu Tyr Ala Ser Asn Leu Tyr Ser Val Ala
85 90 95

Leu Thr His Arg Leu Tyr Ser Gly Leu Tyr Leu Tyr Ser Ser Glu Arg
100 105 110

Ala Arg Gly Ile Leu Glu Ala Arg Gly Thr His Arg Leu Tyr Ser Ile
115 120 125

Leu Glu Ala Ser Asn Ala Ser Pro Pro His Glu Gly Leu Tyr Ser Glu
130 135 140

Arg Pro His Glu Ile Leu Glu Gly Leu Tyr Pro His Glu Leu Tyr Ser
145 150 155 160

Gly Leu Tyr Ser Glu Arg Gly Leu Ala Ser Pro Leu Glu Gly Leu Tyr
165 170 175

Gly Leu Gly Leu Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu
180 185 190

Thr Arg Pro Gly Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro
195 200 205

Val Ala Leu Ser Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly
210 215 220

Leu Tyr Gly Leu Tyr Ala Leu Ala Thr His Arg Gly Leu Asn Thr Arg
 225 230 235 240
 Pro Gly Leu Tyr Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro
 245 250 255
 His Glu Ile Leu Glu Gly Leu Tyr Leu Glu Ala Leu Ala Gly Leu Tyr
 260 265 270
 Gly Leu Pro His Glu Gly Leu Tyr Thr His Arg Leu Glu Ala Arg Gly
 275 280 285
 Ala Leu Ala Gly Leu Tyr Ala Arg Gly Val Ala Leu Ala Leu Ala Ala
 290 295 300
 Ser Asn Gly Leu Asn Pro His Glu Ala Ser Pro Ala Ser Pro Ala Leu
 305 310 315 320
 Ala Ser Glu Arg Gly Leu Asn Ala Leu Ala Ile Leu Glu Ala Ser Pro
 325 330 335
 Pro Arg Thr Arg Pro Ala Ser Pro Ser Glu Arg Ala Ser Asn Ala Ser
 340 345 350
 Asn Ala Ser Pro Val Ala Leu Ala Leu Ala Ser Glu Arg Gly Leu Asn
 355 360 365
 Leu Glu Gly Leu Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg
 370 375 380
 Gly His Ile Ser Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val
 385 390 395 400
 Ala Leu Ser Glu Arg Val Ala Leu Ala Arg Gly Thr Tyr Arg Ala Ser
 405 410 415
 Pro Ser Glu Arg Pro Arg Ala Ser Pro Pro His Glu Ser Glu Arg Gly
 420 425 430
 Leu Tyr Pro His Glu Ser Glu Arg Gly Leu Tyr Ser Glu Arg Val Ala
 435 440 445
 Leu Gly Leu Asn Pro His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly
 450 455 460
 Leu Asn Ala Ser Asn Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu
 465 470 475 480
 Ala Thr Tyr Arg Thr His Arg Pro Arg Ala Leu Ala Thr His Arg Thr
 485 490 495

Tyr Arg Thr His Arg Val Ala Leu Ala Ser Pro Ser Glu Arg Ser Glu
 500 505 510
 Arg Gly Leu Tyr Val Ala Leu Val Ala Leu Thr His Arg Pro Arg Val
 515 520 525
 Ala Leu Pro Arg Ala Leu Ala Val Ala Leu Val Ala Leu Gly Leu Tyr
 530 535 540
 Leu Tyr Ser Pro Arg Gly Leu Tyr Ser Glu Arg Ala Ser Pro Val Ala
 545 550 555 560
 Leu Thr Tyr Arg Thr Tyr Arg Ala Leu Ala Gly Leu Tyr Leu Glu Ala
 565 570 575
 Ser Asn Thr Tyr Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr Gly Leu
 580 585 590
 Tyr Pro His Glu Ala Leu Ala Gly Leu Tyr Ala Ser Asn Thr Tyr Arg
 595 600 605
 Ala Leu Ala Pro His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu Ala Leu
 610 615 620
 Tyr Ser His Ile Ser Ala Leu Ala Ala Ser Asn Val Ala Leu Gly Leu
 625 630 635 640
 Tyr Ala Arg Gly Ala Ser Pro Ala Leu Ala Pro His Glu Ala Ser Asn
 645 650 655
 Leu Glu Pro His Glu Leu Glu Leu Glu Gly Leu Tyr Ala Arg Gly Ile
 660 665 670
 Leu Glu Gly Leu Tyr Gly Leu Ala Ser Pro Ala Ser Pro Gly Leu Ala
 675 680 685
 Leu Ala Leu Tyr Ser Gly Leu Tyr Thr His Arg Ala Ser Pro Pro Arg
 690 695 700
 Leu Glu Leu Tyr Ser Ala Ser Asn His Ile Ser Gly Leu Asn Val Ala
 705 710 715 720
 Leu His Ile Ser Ala Arg Gly Leu Glu Thr His Arg Gly Leu Tyr Gly
 725 730 735
 Leu Tyr Thr Tyr Arg Gly Leu Gly Leu Gly Leu Tyr Gly Leu Tyr Leu
 740 745 750
 Glu Ala Ser Asn Leu Glu Ala Leu Ala Leu Glu Ala Leu Ala Ala Leu
 755 760 765

Ala Gly Leu Asn Leu Glu Ala Ser Pro Leu Glu Ser Glu Arg Gly Leu
770 775 780

Ala Ser Asn Gly Leu Tyr Ala Ser Pro Leu Tyr Ser Thr His Arg Leu
785 790 795 800

Tyr Ser Ala Ser Asn Ser Glu Arg Thr His Arg Thr His Arg Gly Leu
805 810 815

Ile Leu Glu Ala Leu Ala Ala Leu Ala Thr His Arg Ala Leu Ala Ser
820 825 830

Glu Arg Thr Tyr Arg Ala Arg Gly Pro His Glu Gly Leu Tyr Ala Ser
835 840 845

Asn Ala Leu Ala Val Ala Leu Pro Arg Ala Arg Gly Ile Leu Glu Ser
850 855 860

Glu Arg Thr Tyr Arg Ala Leu Ala His Ile Ser Gly Leu Tyr Pro His
865 870 875 880

Glu Ala Ser Pro Pro His Glu Ile Leu Glu Gly Leu Ala Arg Gly Gly
885 890 895

Leu Tyr Leu Tyr Ser Leu Tyr Ser Gly Leu Tyr Gly Leu His Ile Ser
900 905 910

Thr His Arg Ser Glu Arg Thr Tyr Arg Ala Ser Pro Gly Leu Asn Ile
915 920 925

Leu Glu Ile Leu Glu Ala Leu Ala Gly Leu Tyr Val Ala Leu Ala Ser
930 935 940

Pro Thr Tyr Arg Ala Ser Pro Pro His Glu Ser Glu Arg Leu Tyr Ser
945 950 955 960

Ala Arg Gly Thr His Arg Ser Glu Arg Ala Leu Ala Ile Leu Glu Val
965 970 975

Ala Leu Ser Glu Arg Gly Leu Tyr Ala Leu Ala Thr Arg Pro Leu Glu
980 985 990

Leu Tyr Ser Ala Arg Gly Ala Ser Asn Thr His Arg Gly Leu Tyr Ile
995 1000 1005

Leu Glu Gly Leu Tyr Ala Ser Asn Thr Tyr Arg Thr His Arg Gly
1010 1015 1020

Leu Asn Ile Leu Glu Ala Ser Asn Ala Leu Ala Ala Leu Ala Ser
1025 1030 1035

Glu Arg Val Ala Leu Gly Leu Tyr Leu Glu Ala Arg Gly His Ile
Page 34

1040

1045

1050

Ser Leu Tyr Ser Pro His Glu
1055 1060

<210> 21
<211> 45
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 21
cgcgagatct catatggatg tcagcctata cggcgaaatc aaagc 45

<210> 22
<211> 46
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 22
cgtcggtttg cgccacaaat tctaagatg gactgaagat ctcgcg 46

<210> 23
<211> 70
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 23
cgcgagatct catatggatg tcagcctata cggcgaaatc aaagccggcg tggaaggcag 60
gaactaccag 70

<210> 24
<211> 1110
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 24
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caattgaccg agcagccctc aaaggctcaa ggtcaaacga acaatcaggt aaaagttact 120
aaggcaaaaa gccgcatcag gacgaaaatc agcgatttcg gctcgtttat cggctttaag 180
gggagtgagg atttgggcga cgagctgaag gctgtttggc agcttgagca agacgtatcc 240
gttgccggcg gcggcgcgac ccgttggggc aatagggaaat cctttgtcgg cttggcaggc 300
gaattcggca cgctgcgcgc cggccgcgtt gcgaatcagt ttgacgatgc cagccaagcc 360
attgatcctt gggacagcaa caatgatgtg gcttcgcaat tgggtatattt caaacgccac 420
gacgatatgc cggtttccgt acgctacgac tctccggact tttccggttt cagcggcagc 480
gtccaattcg ttccgatcca aaacagcaag tccgcctata agccggctta tgtggatgag 540
aagaagatgg ttcattgcggc tgttgtcggc aagcccggat cggatgtgta ttatgccggt 600
ctgaattaca aaaatggcgg atttgccggg agctatgcct ttaaataatgc gagacacgcc 660
aatgtcggac gtgatgcttt tgagttgttc ttgctcggca gcacgagtga tgaagccaaa 720
ggtaccgatc ccttgaaaaa ccatcaggta caccgcctga cgggcggcta tgaggaaggc 780
ggcttgaatc tcgccttggc ggcccagttg gatttgtctg aaaatggcga caaagccaaa 840

accaaaaaca gtacgaccga aattgccgcg actgcttcct accgcttcgg taatgcagtt 900
 ccacgcatca gctatgccca tggtttcgac ttgatcgaac gcggtaaaaa aggcgaaaat 960
 accagctacg atcaaatcat cgccggcggtt gattatgatt tttccaaacg cacttcgcc 1020
 atcgtgtctg gcgcttggtt gaaacgcaat accggcatcg gcaactacac tcaaattaat 1080
 gccgcctccg tcggtttgcg ccacaaattc 1110

<210> 25
 <211> 370
 <212> PRT
 <213> Neisseria meningitidis (group B)

<400> 25

Met Ala Val Ser Leu Thr Gly Gly Ile Leu Ala Gly Val Gly Gly Ala
1 5 10 15

Ala Ile Gly Leu Gly Leu Thr Gly Gly Pro Ser Leu Ala Gly Gly Gly
20 25 30

Thr Ala Ala Gly Val Leu Val Thr Leu Ala Leu Ser Ala Ile Ala Thr
35 40 45

Leu Ile Ser Ala Pro Gly Ser Pro Ile Gly Pro Leu Gly Ser Gly Ala
50 55 60

Leu Gly Ala Gly Leu Leu Ala Val Thr Gly Leu Gly Gly Ala Val Ser
65 70 75 80

Val Ala Gly Gly Gly Ala Thr Ala Thr Gly Ala Ala Gly Ser Pro Val
85 90 95

Gly Leu Ala Gly Gly Pro Gly Thr Leu Ala Ala Gly Ala Val Ala Ala
100 105 110

Gly Pro Ala Ala Ala Ser Gly Ala Ile Ala Pro Thr Ala Ser Ala Ala
115 120 125

Ala Val Ala Ser Gly Leu Gly Ile Pro Leu Ala His Ala Ala Met Pro
130 135 140

Val Ser Val Ala Thr Ala Ser Pro Ala Pro Ser Gly Pro Ser Gly Ser
145 150 155 160

Val Gly Pro Val Pro Ile Gly Ala Ser Leu Ser Ala Thr Leu Pro Ala
165 170 175

Thr Val Ala Gly Leu Leu Met Val His Ala Ala Val Val Gly Leu Pro
180 185 190

Gly Ser Ala Val Thr Thr Ala Gly Leu Ala Thr Leu Ala Gly Gly Pro
195 200 205

Ala Gly Ser Thr Ala Pro Leu Thr Ala Ala His Ala Ala Val Gly Ala
210 215 220

Ala Ala Pro Gly Leu Pro Leu Leu Gly Ser Thr Ser Ala Gly Ala Leu
225 230 235 240

Gly Thr Ala Pro Leu Leu Ala His Gly Val His Ala Leu Thr Gly Gly
245 250 255

Thr Gly Gly Gly Gly Leu Ala Leu Ala Leu Ala Ala Gly Leu Ala Leu
260 265 270

Ser Gly Ala Gly Ala Leu Ala Leu Thr Leu Ala Ser Thr Thr Gly Ile
275 280 285

Ala Ala Thr Ala Ser Thr Ala Pro Gly Ala Ala Val Pro Ala Ile Ser
290 295 300

Thr Ala His Gly Pro Ala Leu Ile Gly Ala Gly Leu Leu Gly Gly Ala
305 310 315 320

Thr Ser Thr Ala Gly Ile Ile Ala Gly Val Ala Thr Ala Pro Ser Leu
325 330 335

Ala Thr Ser Ala Ile Val Ser Gly Ala Thr Leu Leu Ala Ala Thr Gly
340 345 350

Ile Gly Ala Thr Thr Gly Ile Ala Ala Ala Ser Val Gly Leu Ala His
355 360 365

Leu Pro
370

<210> 26
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<220>
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<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid
<400> 26

Ala Asp Ile Gly Xaa Gly Leu Ala Asp Ala
1 5 10

<210> 27
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<220>
 <221> misc_feature
 <222> (3)..(3)
 <223> xaa can be any naturally occurring amino acid
 <400> 27

Ile Gly Xaa Gly Leu Ala Asp Ala Leu Thr
 1 5 10

<210> 28
 <211> 10
 <212> PRT
 <213> Neisseria meningitidis (group B)
 <400> 28

Ser Leu Asn Thr Gly Lys Leu Lys Asn Asp
 1 5 10

<210> 29
 <211> 17
 <212> PRT
 <213> Neisseria meningitidis (group B)

<220>
 <221> misc_feature
 <222> (12)..(12)
 <223> xaa can be any naturally occurring amino acid
 <400> 29

Ser Leu Asn Thr Gly Lys Leu Lys Asn Asp Lys Xaa Ser Arg Phe Asp
 1 5 10 15

Phe

<210> 30
 <211> 9
 <212> PRT
 <213> Neisseria meningitidis (group B)

<220>
 <221> misc_feature
 <222> (6)..(6)
 <223> xaa can be any naturally occurring amino acid
 <400> 30

Ser Gly Glu Phe Gln Xaa Tyr Lys Gln
 1 5

<210> 31
 <211> 8
 <212> PRT
 <213> Neisseria meningitidis (group B)

<220>
 <221> misc_feature
 <222> (6)..(6)

<223> xaa can be any naturally occurring amino acid

<400> 31

Ile Glu His Leu Lys Xaa Pro Glu
1 5

<210> 32

<211> 10

<212> PRT

<213> Neisseria meningitidis (group B)

<220>

<221> misc_feature

<222> (10)..(10)

<223> xaa can be any naturally occurring amino acid

<400> 32

Gly Gly Gly Val Ala Ala Asp Ile Gly Xaa
1 5 10

<210> 33

<211> 9

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 33

Ser Gly Glu Phe Gln Ile Tyr Lys Gln
1 5

<210> 34

<211> 10

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 34

His Ser Ala Val Val Ala Leu Gln Ile Glu
1 5 10

<210> 35

<211> 10

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 35

Glu Lys Ile Asn Asn Pro Asp Lys Ile Asp
1 5 10

<210> 36

<211> 10

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 36

Ser Leu Ile Asn Gln Arg Ser Phe Leu Val
1 5 10

<210> 37
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 37

Ser Gly Leu Gly Gly Glu His Thr Ala Phe
1 5 10

<210> 38
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 38

Gly Glu His Thr Ala Phe Asn Gln Leu Pro
1 5 10

<210> 39
<211> 11
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 39

Ser Phe Leu Val Ser Gly Leu Gly Gly Glu His
1 5 10

<210> 40
<211> 34
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 40

Glu Lys Ile Asn Asn Pro Asp Lys Ile Asp Ser Leu Ile Asn Gln Arg
1 5 10 15

Ser Phe Leu Val Ser Gly Leu Gly Gly Glu His Thr Ala Phe Asn Gln
20 25 30

Leu Pro

<210> 41
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 41

Gly Lys Ala Glu Tyr His Gly Lys Ala Phe
1 5 10

<210> 42
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 42

Tyr His Gly Lys Ala Phe Ser Ser Asp Asp
1 5 10

<210> 43
<211> 14
<212> PRT
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<400> 43

Gly Lys Ala Glu Tyr His Gly Lys Ala Phe Ser Ser Asp Asp
1 5 10

<210> 44
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 44

Ile Glu His Leu Lys Thr Pro Glu Gln Asn
1 5 10

<210> 45
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 45

Lys Thr Pro Glu Gln Asn Val Glu Leu Ala
1 5 10

<210> 46
<211> 14
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 46

Ile Glu His Leu Lys Thr Pro Glu Gln Asn Val Glu Leu Ala
1 5 10

<210> 47
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 47

Ala Glu Leu Lys Ala Asp Glu Lys Ser His
1 5 10

<210> 48
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 48

Ala Val Ile Leu Gly Asp Thr Arg Tyr Gly
1 5 10

<210> 49
<211> 20
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 49

Ala Glu Leu Lys Ala Asp Glu Lys Ser His Ala Val Ile Leu Gly Asp
1 5 10 15

Thr Arg Tyr Gly
20

<210> 50
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 50

Glu Glu Lys Gly Thr Tyr His Leu Ala Leu
1 5 10

<210> 51
<211> 14
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 51

Lys Ile Asn Asn Pro Asp Lys Ile Asp Ser Leu Ile Asn Gln
1 5 10

<210> 52
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<212> PRT
<213> Neisseria meningitidis (group B)

<400> 52

Asp Glu Lys Ser His Ala Val Ile Leu Gly
1 5 10

<210> 53
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 53

Lys Ile Gly Glu Lys Val His Glu Ile Gly
1 5 10

<210> 54
<211> 10
<212> PRT
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<400> 54

Leu Ile Thr Leu Glu Ser Gly Glu Phe Gln

1 5 10

<210> 55
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 55

Ser Ala Leu Thr Ala Leu Gln Thr Glu Gln
1 5 10

<210> 56
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 56

Phe Gln Val Tyr Lys Gln Ser His Ser Ala
1 5 10

<210> 57
<211> 26
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 57

Leu Ile Thr Leu Glu Ser Gly Glu Phe Gln Val Tyr Lys Gln Ser His
1 5 10 15

Ser Ala Leu Thr Ala Leu Gln Thr Glu Gln
20 25

<210> 58
<211> 10
<212> PRT
<213> Neisseria meningitidis (group B)

<400> 58

Ile Gly Asp Ile Ala Gly Glu His Thr Ser
1 5 10

<210> 59
<211> 10
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 Xaa Ala Gln Gly Ala Glu Lys Thr Xaa Xaa Xaa Gly Asp Ser Leu Asn
 50 55 60
 Thr Gly Lys Leu Lys Asn Asp Lys Xaa Ser Arg Phe Asp Phe Xaa Xaa
 65 70 75 80
 Xaa Ile Xaa Val Asp Gly Xaa Xaa Ile Thr Leu Xaa Ser Gly Glu Phe
 85 90 95
 Gln Xaa Tyr Lys Gln Xaa His Ser Ala Xaa Xaa Ala Leu Gln Xaa Glu
 100 105 110
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Xaa
 115 120 125
 Phe Xaa Xaa Xaa Xaa Xaa Xaa Gly Glu His Thr Xaa Phe Xaa Xaa Leu
 130 135 140
 Pro Xaa Xaa Xaa Ala Xaa Tyr Xaa Gly Xaa Ala Phe Xaa Ser Asp Asp
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 Xaa Xaa Gly Xaa Leu Xaa Tyr Xaa Ile Asp Phe Xaa Xaa Lys Gln Gly
 165 170 175
 Xaa Gly xaa Ile Glu His Leu Lys Xaa Pro Glu Xaa Asn Val Xaa Leu
 180 185 190
 Ala Xaa Xaa Xaa Xaa Lys Xaa Asp Glu Lys Xaa His Ala Val Ile Xaa
 195 200 205
 Gly Xaa Xaa Xaa Tyr Xaa Xaa Xaa Glu Lys Gly Xaa Tyr Xaa Leu Xaa
 210 215 220
 Xaa Xaa Gly Xaa Xaa Ala Gln Glu Xaa Ala Gly Xaa Ala Xaa Val Xaa
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35 40 45

Xaa Ala Gln Gly Ala Glu Lys Thr Xaa Xaa Xaa Gly Asp Ser Leu Asn
50 55 60

Thr Gly Lys Leu Lys Asn Asp Lys Xaa Ser Arg Phe Asp Phe Xaa Xaa
65 70 75 80

Xaa Ile Xaa Val Asp Gly Gln Xaa Ile Thr Leu Xaa Ser Gly Glu Phe
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Gln Ile Tyr Lys Gln Xaa His Ser Ala Val Val Ala Leu Gln Ile Glu
100 105 110

Lys Ile Asn Asn Pro Asp Lys Ile Asp Ser Leu Ile Asn Gln Arg Ser
115 120 125

Phe Leu Val Ser Gly Leu Gly Gly Glu His Thr Ala Phe Asn Gln Leu
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Pro Xaa Gly Lys Ala Glu Tyr His Gly Lys Ala Phe Ser Ser Asp Asp
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Xaa Xaa Gly Xaa Leu Xaa Tyr Xaa Ile Asp Phe Xaa Xaa Lys Gln Gly
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Xaa Gly Xaa Ile Glu His Leu Lys Thr Pro Glu Gln Asn Val Glu Leu
180 185 190

Ala Xaa Ala Glu Leu Lys Ala Asp Glu Lys Ser His Ala Val Ile Leu
195 200 205

Gly Asp Thr Arg Tyr Gly Xaa Glu Glu Lys Gly Thr Tyr His Leu Ala
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Xaa Ala Gln Gly Ala Glu Lys Thr Tyr Gly Asn Gly Asp Ser Leu Asn
50 55 60

Thr Gly Lys Leu Lys Asn Asp Lys Val Ser Arg Phe Asp Phe Ile Arg
65 70 75 80

Gln Ile Glu Val Asp Gly Xaa Leu Ile Thr Leu Glu Ser Gly Glu Phe
85 90 95

Gln Val Tyr Lys Gln Ser His Ser Ala Leu Thr Ala Leu Gln Thr Glu
100 105 110

Gln Xaa Gln Asp Xaa Glu Xaa Ser Xaa Lys Met Val Ala Lys Arg Xaa
115 120 125

Phe Xaa Ile Gly Asp Ile Ala Gly Glu His Thr Ser Phe Asp Lys Leu
130 135 140

Pro Lys Xaa Xaa Xaa Ala Thr Tyr Arg Gly Thr Ala Phe Gly Ser Asp
145 150 155 160

Asp Ala Gly Gly Lys Leu Thr Tyr Thr Ile Asp Phe Ala Ala Lys Gln
165 170 175

Gly His Gly Lys Ile Glu His Leu Lys Ser Pro Glu Leu Asn Val Xaa
180 185 190

Leu Ala Xaa Xaa Tyr Ile Lys Pro Asp Glu Lys Xaa His Ala Val Ile
195 200 205

Ser Gly Ser Val Leu Tyr Asn Gln Asp Glu Lys Gly Ser Tyr Ser Leu
210 215 220

Gly Ile Phe Gly Xaa Xaa Ala Gln Glu Val Ala Gly Ser Ala Glu Val
225 230 235 240

Glu Thr Ala Asn Gly Ile His His Ile Gly Leu Ala Ala Lys Gln
245 250 255